



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2022/2023

SPECIAL/SUPPLEMENTARY EXAMINATION FOR THE DEGREE OF BACHELOR OF  
SCIENCE IN CHEMISTRY

### SCS 3101: ORGANIC CHEMISTRY

DATE: AUGUST 2023

TIME: 2 HOURS

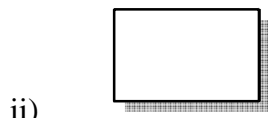
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INSTRUCTIONS: *answer question one and any other two questions*

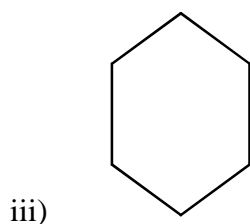
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#### QUESTION ONE (30 MARKS)

- a) Define the term hydrocarbon (1 mark)
- b) Write the electron configuration of the following atoms using spdf notation
- i) C = 6 (1 mark)
  - ii) N = 7 (1 mark)
  - iii) K = 19 (1 mark)
  - iv) O = 8 (1 mark)
- c) What is hybridization? (1 mark)
- d) Differentiate between Pure covalent and polar covalent bond (2 marks)
- e) With reasons arrange the following hydrocarbons from lowest to highest boiling point: C<sub>2</sub>H<sub>6</sub>, C<sub>3</sub>H<sub>8</sub>, C<sub>4</sub>H<sub>10</sub> (3 marks)
- f) Name the following organic compounds
- i) C<sub>8</sub>H<sub>18</sub> (1 mark)



(1 mark)



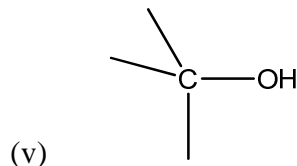
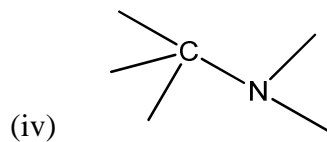
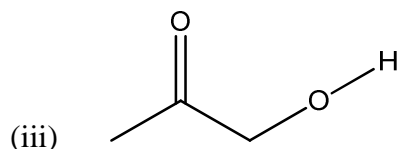
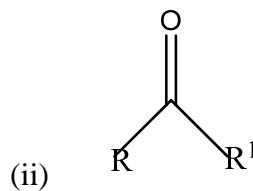
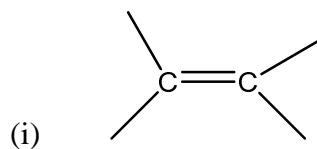
(1 mark)

g) Differentiate between thermal and catalytic cracking of hydrocarbons

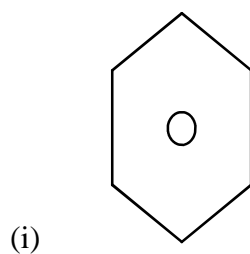
(2 marks)

h) Name the functional group for each of the following compounds

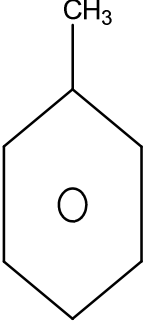
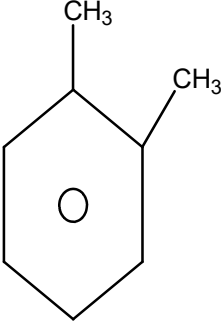
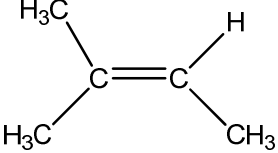
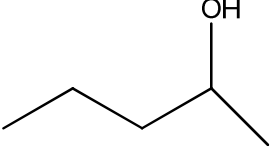
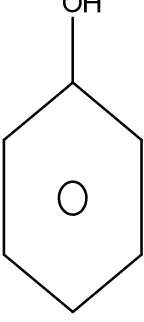
(5 marks)

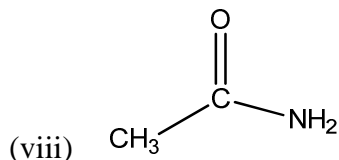


i) Name the following organic components

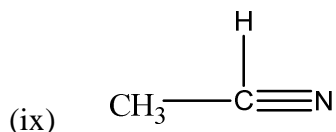


(1 mark)

- (ii)  (1 mark)
- (iii)  (1 mark)
- (iv)  (1 mark)
- (v)  (1 mark)
- (vi)  (1 mark)
- (vii)  $\text{CH}_3\text{OH}$  (1 mark)



(1 mark)



(1 mark)

### QUESTION TWO (20 MARKS)

- a) Consider the compounds dimethylether  $\text{CH}_3\text{OCH}_3$  ethanol  $\text{CH}_3\text{CH}_2\text{OH}$  and propane  $\text{CH}_3\text{CH}_2\text{CH}_3$ . Their boiling points not necessarily in order are  $-42.1^\circ\text{C}$ ,  $-24.8^\circ\text{C}$  and  $78.4^\circ\text{C}$ , match each compound with its boiling point. Explain your reasoning (5 marks)
- b) Discuss covalent bonding (10 marks)
- c) Using sodium and chlorine atoms discuss ionic bonding (5 marks)

### QUESTION THREE (20 MARKS)

Discuss methods of preparing alkanols (20 marks)

### QUESTION FOUR (20 MARKS)

- a) Give the structural formula for each of the following alkanols and tell whether it is a primary, secondary or tertiary (10 marks)
- (i) 3 – pentanol
- (ii) 2, 2-dimethyl-1-propanol
- (iii) 2 methyl-1-butanol
- (iv) 3-methyl-pentanol
- (v) 1-methylcyclobutanol
- b) With reference to water molecule discuss electronegativity (5 marks)
- c) With examples differentiate between ketones and aldehydes (5 marks)